

In re Patent Application of
MANARESI ET AL.
Serial No. 09/996,070
Filed: NOVEMBER 28, 2001

REMARKS

Applicants thank the Examiner for the careful and thorough examination of the present application, and for the indication of allowable subject matter. Claims 16-39 remain pending in the application. Favorable reconsideration is respectfully requested.

I. The Invention

As shown in FIGS. 1-16 and described in the present specification, the disclosed invention is directed to a device for detecting the pressure exerted at different points of a flexible and/or pliable object that may assume different shapes, and includes a plurality of capacitive pressure sensors and at least a system for biasing and reading the capacitance of the sensors. The requirements of flexibility or pliability are satisfied by capacitive pressure sensors formed by two orthogonal sets of parallel or substantially parallel electrodes spaced, at least at each crossing between an electrode of one set and an electrode of the other set, by an elastically compressible dielectric, forming an array of pressure sensing pixel capacitors. In various embodiments, the electrodes are spaced only at each crossing by a respective elastically compressible dielectric pad. The system for biasing and reading the capacitance includes column plate electrode selection circuits and row plate electrode selection circuits and a logic circuit for sequentially scanning the pixel capacitors and outputting pixel values of the pressure

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for reconstructing a distribution map of the pressure over the area of the array.

II. The Claims are Patentable

Claims 16-19, 21-26, 28-32 and 34-36 were rejected in view of Bourland et al. (U.S. 5,010,772) in combination with Naito et al. (U.S. 6,462,932) or in further combination with Nomura et al. (U.S. 5,920,454) or Wright et al. (U.S. 4,348,635) for the reasons set forth on pages 2-5 of the Office Action. Applicants contend that Claims 16-19, 21-26, 28-32 and 34-36 clearly define over the cited references, and in view of the following remarks, favorable reconsideration of the rejections under 35 U.S.C. §103 is requested.

Independent Claims 16, 23, 29 and 35, include an array of pressure sensing pixel capacitors comprising column electrodes and row electrodes orthogonal to each other, and a plurality of individually spaced apart elastically compressible dielectric pads positioned between each respective crossing of the column electrodes and row electrodes. The associated description of such claim features can be found on pages 19-22 of the present specification referring to FIGs. 13-16 of the drawings.

It is this combinations of features which is not fairly taught or suggested in the cited references and which patentably defines over the cited references.

As previously discussed, the Bourland patent is directed to a capacitive measuring pad constructed of transverse conductive strips separated by a compressible

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insulator to form a matrix of pressure sensitive capacitive nodes. The nodes are repetitively scanned in sequence by a microcomputer to measure their respective capacitances, from which measurements a pressure map is then derived. Node capacitance is found by measuring the response of the node to a driving signal of a known voltage. This measurement is accomplished by connecting one of the node's transverse conductive strips to the driving source and the node's other conductive strips to a sense amplifier.

However, Applicants note that the compressible insulating layer of the capacitive measuring pad in Bourland et al. is a continuous dielectric layer. Indeed, as correctly recognized by the Examiner, there is no plurality of individually spaced apart elastically compressible dielectric pads positioned at each crossing between a column electrode and a row electrode, as claimed.

As can be appreciated, when detecting the pressure exerted at different points of a flexible and/or pliable object that may assume different shapes, it may be important that the measured values of pressure be as independent as possible from one another. By using distinct elastically compressible dielectric pads at each crossing between a column electrode and a row electrode, the measure value of pressure corresponding to the deflection of each pad is less affected by the deflection of neighboring crossing points.

The Examiner has now relied upon the newly cited patent to Naito et al. (referring to Cols. 4 and 5 and Figs. 2 and 2A of Naito) as allegedly teaching the use of "plural

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dielectric portions 32" separating electrodes 33 and 34. Applicants maintain that the Examiner has mischaracterized the actual teachings of the Naito reference.

Indeed, as described in Col. 5 of the Naito patent, the multilayer capacitor has a plurality of dielectric layers 32 and a plurality of pairs of electrodes. However, there is no plurality of individually spaced apart elastically compressible dielectric pads positioned between each respective crossing of column electrodes and row electrodes, as claimed. The cross-sectional view of Fig. 2A in Naito may appear to the Examiner as showing individual dielectric pads 32. However, a more thorough study of the reference, and in particular Figs. 3 and 4 and the associated description in Col. 5 of Naito, reveals that connection portions 40 and 41 are vias formed by holes filled with conductive paste to connect various electrode layers. But the dielectric layers 32 continue around the vias 40 and 41 as clearly shown in Figs. 3 and 4 of Naito.

The other cited references were relied upon for their respective teachings of the use of conductive paint and conductive tape. However, neither of these references makes up for the deficiencies of Bourland et al. or Naito et al. as discussed above.

As the Examiner is aware, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference.

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Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim features. The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the Applicants have done. To support the conclusion that the claimed invention is directed to obvious subject matter, either the reference must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the reference. Both the suggestion to make the claimed combination and the reasonable expectation of success must be founded in the prior art and not in Applicants' disclosure.

There is simply no teaching or suggestion in the cited references to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Applicants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claims 16, 23, 29 and 35. Furthermore, no proper modification of the teachings of these references could result in the invention as claimed. Thus, the rejection under 35 U.S.C. § 103 should be withdrawn.

It is submitted that the independent claims are patentable over the prior art. In view of the patentability of the independent claims, it is submitted that their dependent claims, which recite yet further distinguishing features are also patentable over the cited references for at

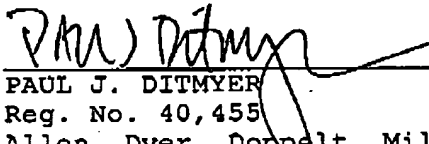
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least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

III. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the present application is in condition for allowance. An early notice thereof is earnestly solicited. If, after reviewing this Response, there are any remaining informalities which need to be resolved before the application can be passed to issue, the Examiner is invited and respectfully requested to contact the undersigned by telephone in order to resolve such informalities.

Respectfully submitted,


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